Jean Piaget
(1896 – 1980)

Chapter 11

2. Published a paper on the albino sparrow when 11.
3. At 21, received his PhD from the University of Neuchâtel. Studied briefly at the University of Zürich.
4. He went to Paris and taught at the Grange-Aux-Belles street school for boys run by Binet.
5. In 1921, became director of studies at Jean-Jacques Rousseau Institute, Geneva.
6. Became chair of psychology, sociology and history of science at Neuchâtel from 1925-29.)
Jean Piaget

7. Served as directors to history of scientific thinking at Geneva (1929-39); the International Bureau of Education (1929-1967); psychology and sociology at Lausanne (1938-51); sociology at Geneva (1939-52), genetic and experimental psychology 1940-71).

Jean Piaget

8. He was the only Swiss to be invited at the Sorbonne from (1952-63). He created and directed the International Center for Genetic Epistemology (1951-80).
9. Married a student at Jean-Jacques Rousseau Institute, and had three children.

Jean Piaget

10. Wrote down 60 books and hundreds of research articles.
Binet-Simon Scale

1. To test intelligence Binet (1904) and later Binet and Simon (1908), devised a scale that consisted of thirty tasks of increasing complexity.
2. Easy tasks included, following a lighted match visually, or shake hands etc.
3. Slightly harder tasks required naming body parts, repeat a series of 3 digits, define words like “house” or “fork” etc.
4. More difficult test items required drawings from memory or constructing sentences from words.

5. The hardest tasks included repeating back 7 random digits, rhyming words, and answering questions involving complexity etc.
6. Number of successfully completed tasks determined the child mental age. If an 8 year-old child passed all the items, usually passed by 8 year-olds, but nothing beyond, then this child would have a chronological and mental age equaling 8.

Intelligence Testing

1. When Piaget worked for Binet, he was fascinated by the mistakes children made on the Scale.
2. Piaget found that children of the same age-group made the same kind of mistakes. These mistakes were qualitatively different for one age-group of children than for another.
3. Since these mistakes were qualitative in nature, Piaget employed open-ended form of questioning (clinical method) with children to study them.
Piaget’s Conclusions

1. It is through the analysis of these mistakes that Piaget realized that intelligence cannot be measured by conventional intelligence tests.
2. The individual and the environment are changing constantly, so intelligence works as a mode (trait) to optimize individual's response in its survival.
3. Intelligent act leads the individual to deal effectively with his environment, i.e., make him adapt to his environment.

Piaget’s Conclusions

4. Like Binet, Piaget concluded that intelligence was not inherited, it was a dynamic trait changing all the time due to biological maturation and the individual’s experience.
5. These conclusions were based on his previous involvement with the study of epistemology inculcated in him by his godfather, Swiss scholar Samuel Cornut.
6. This understanding finally culminated in what Piaget called genetic epistemology (1950), i.e., study of development of knowledge.

General Summary

A general understanding of Piaget’s theory is based on the idea that humans pass through stages of physical and intellectual development. As our bodies grow so does our intellect.

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Cognitive Structure

A cognitive structure consists of schemas (or schemata), and results from both biological maturation and cumulative experience. Therefore, a cognitive structure develops and grows over an individual’s life span.

Schema

A schema is an element of the cognitive structure, and is a general potential to engage in a class of actions. So, grasping, sucking, reaching etc., are all schemas for Piaget, and not reflexes; because a variety of actions can be made by them.

Content

Whenever an action is carried out, based on a schema, one has to take into consideration the stimuli that led to that action. These stimuli, aspects or ingredients in the environment, and manifest a schema are called content.

So a scroll, a book and a pencil all are contents, for they manifest the grasping schema.
Actions

A schema can lead to an overt action (behavioral response) or a covert action (thinking). So when an individual grasps a book that is an overt action. However, when one thinks of grasping an object (a golf club) that is a covert action.

Assimilation

1. An infant is bounded by her cognitive structure to assimilate the environment. If she only possesses sucking and grasping as available schemas then she will interact with the environment using only these schemas.
2. The process of responding to the environment in accordance with one’s cognitive structure is called assimilation. In assimilation existing cognitive structures are matched with physical environment.

Assimilation

3. Number of schemas or cognitive structure determines what aspects of the environment “exist” for the individual.
Accommodation

1. Clearly if assimilation was the only cognitive process available to the individual, then there would be no intellectual growth.
2. Every experience is readily assimilated if the schemata are available, however if no schemas are available, accommodation makes new schemas.
3. **Accommodation** is then a process that modifies cognitive structure or more simply a process of learning.

Equilibration

1. There is constant tug between the processes of assimilation and accommodation. This is the force behind intellectual growth.
2. Sometimes there are more assimilation processes going on in an individual than accommodation, and vice versa. And at times the two processes stand at equilibrium.
3. **Equilibration** is the innate tendency to organize individual’s experiences to assure maximal adaptation.
Functional Invariance

Assimilation and accommodation are functional invariant processes and exist at all intellectual levels of growth and development. However, there is more accommodation than assimilation early in life, which reverses in later stages.

<table>
<thead>
<tr>
<th>Process</th>
<th>Early</th>
<th>Late</th>
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</thead>
<tbody>
<tr>
<td>Assimilation</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Accommodation</td>
<td>High</td>
<td>Low</td>
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Stages of Development

<table>
<thead>
<tr>
<th>Age</th>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td>2 to 7 years</td>
<td>Preoperational Stage</td>
<td>Understanding of Symbols. Egocentric.</td>
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<tr>
<td>7 - 11 years</td>
<td>Concrete Operations Stage</td>
<td>More than one point of view. No abstract problems.</td>
</tr>
<tr>
<td>11 years and above</td>
<td>Formal Operations Stage</td>
<td>Abstract thinking. Reason logically.</td>
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Sensorimotor Stage

1. A stage between birth-2 years, and is marked by infant’s inability to express a formal language.
2. The infant begins to learn about the world through sensory and motor interactions. At first the infant carries out simple reflex actions (grasping) followed by voluntary actions of grasping.
3. Between 1-4 months, the child practices primary circular reactions, actions that serve as stimuli and responses. For example, sucking her thumb feels good, so she sucks some more.
Sensorimotor Stage

4. Between 4-12 months, the infant engages in secondary circular reactions. These actions involve the environment. Squeezing a rubber ducky, makes it “quack,” so let us do it again, and again. Before 6-7 months the infant has no concept of object permanence, which develops through the process of interiorization, later on.

Preoperational Stage

1. This stage is marked by 2-7 years, when mental representations can now be understood in the form of symbols. A symbol is anything that represents something else, e.g., a spoken word, a written word, or a picture of a cat, represents a real cat. Clearly the use of language becomes prominent.

2. During 2-4 years (preconceptual thinking) the child’s use of symbols is observed in creative play. When daddy is invited to a tea party and inanimate objects represent real ones.
Preoperational Stage

3. Rudimentary concept formation is also observed in children at this stage, e.g., toys are mine, cow is a big animal and chicken is small (transductive logic).

4. The child can now think of past and future. Tell him that he needs to be careful around the stove, and he can easily relate it to the past when he burnt himself.

5. However, the child is quite egocentric during this stage, i.e., she sees things pretty much from her own point of view. Piaget and Inhelder (1948) used the “three mountain test” to show egocentrism.

6. Period of intuitive thought (4-7 years). Problem solving without logical rules, and thus are unable to correctly carry out conservation problems.
Concrete Operations Stage

1. This stage lasts from 7-11 years, the child not only uses symbols but can manipulate them logically. Thus uses logical operations to solve problems. But the problems need to be concrete in context.

2. By 6-7 most children, have the ability to conserve volume, length, mass and number. A child knows that number of marbles are equal in the long and the short column.

Concrete Operations Stage

3. By 7-8 years, children learn logical operations can be reversed. So a big ball of clay can be divided into small balls and put back together. The mass of big and small balls remain the same. Similarly, reversibility of operations can work at the thinking level:
   \[ 3 + 5 = 8, \quad 8 - 3 = 5 \]

4. By 9-10 at last children master area conservation.

Concrete Operations Stage

5. By 10-11 years, the child learns class inclusion. Children now understand classes and subclasses. When shown 8 orange and 4 green candies, and asked whether there are more orange candies or more candies. The child in this stage will say "more candies".

6. Transitivity the ability to make logical inferences on the basis of separate relationships develops at this stage, e.g., if John is taller than Frank, and Frank is taller than Bob, then John is taller than Bob.
Concrete Operations Stage

7. Also at this stage sorting and **seriation** problems are correctly solved.

\[
\begin{array}{ccc}
A & 5 & J \\
10 & E & 1 \\
\end{array}
\]

Formal Operations Stage

1. This stage ranges from 11 to adulthood.
2. Now the individual is able to solve abstract problems, moving on from concrete operation problems.
3. At this stage the individual starts to **systematically search for solutions** like the pendulum and other problems. In short **hypothesis testing** begins at this stage.

Pendulum Problem

Adolescents and adults quickly find answers to pendulum problem, like what factors would determine the speed of pendulum. Is it the length of string, weights, or the initial swing? With hypothesis testing they work it out and find that it is the string’s length that determines the speed.
Formal Operations Stage

4. If a card has a vowel on one side then it has an even number on the other side. Which card(s) would you pick?

   E   J   6   7

5. The thinking attained at this stage remains for the rest of the life. Although not everyone develops this level of thinking (Dulit, 1972).

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Evaluation

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<th>Contributions</th>
<th>Criticisms</th>
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<tr>
<td>Qualitative and developmental aspects of learning.</td>
<td>Theory is based on clinical insights. Some experimental evidence fail these insights.</td>
</tr>
<tr>
<td>Description of developmental stages of attaining knowledge and learning.</td>
<td>Developmental stages may not generalize to non-western cultures.</td>
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Lev Vygotsky (1896-1934)  
Vygotsky says, that intellectual development may be speeded-up with assistance before stage reaches its maturation.

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Questions

28. Into what camp does Piaget’s theory fall?
29. What is meant by equilibration? How does the process work?
30. Compare Piaget’s stages of development with Freud’s developmental stages.